United States Patent Application

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UV Bulk Mail Irradiation System

Abstract

The UV Bulk Mail Irradiation System consists of a chamber for disinfecting mail that has become contaminated by pathogens and spores such as Bacillius anthracis (anthrax bacteria) and Bacillius magaterium sp. (anthrax spores). Contaminated mail is placed in the chamber. Consideration for the characteristics of the chamber in which the contaminated mail has been place, the location of the C-band ultraviolet lights, the duration of the sterilization process allow effective elimination of this biohazard from the contaminated mail.

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FIELD OF THE INVENTION

The present invention relates to the field of germicidal systems employing microorganisms-destroying ultraviolet lights. In particular, the present invention relates to a system for producing enough watts of C-band UV energy in a sterilization chamber to disinfect mail contaminated with anthrax bacteria and anthrax spores in five (5) minutes of less.

BACKGROUND OF THE INVENTION

After September 11, 2001, it has become very apparent that our mail system has become a biohazard target for Terrorists across the globe. Numerous deaths have resulted from our citizens coming in contact with mail pieces infected with anthrax. These mail pieces were either filled with anthrax or they were laced with the biohazard due to cross-contamination from mail pieces travelling in our mail system.

The current methods that are being tried in an effort to sterilize the mail have been ineffective, unsafe, and damaging to the mail content. Using this invention is safe for the user and does not damage the content of the mail.

The C-band ultraviolet light used in this invention has always been known for its germicidal properties. Especially, the C-band ultraviolet light spectrum of 254 nm, which has been found to disrupt and mutilate pathogens DNA, leading to pathogens cell death.

SUMMARY OF THE INVENTION

The present invention is a chamber for disinfecting mail that has become contaminated by pathogens and spores such as Bacillius anthracis (anthrax bacteria) and Bacillius magaterium sp. (anthrax spores). Ultraviolet lights of sufficient intensity are positioned within a disinfecting chamber where they irradiate mail pieces contaminated with pathogens and spores such as Bacillius anthracis (anthrax bacteria) and Bacillius magaterium sp. (anthrax spores). The sterilization chamber has an entrance and an exit. The contaminated mail pieces are brought in through the entrance, placed in the chamber, the doors are sealed, and the irradiation process begins. After the mail pieces are decontaminated, they are removed, a new batch of mail pieces takes their place, and the decontamination process starts all over again.

DESCRIPTION OF THE INVENTION

The present invention consists of a chamber 8 feet wide, 8 feet high, and 16 feet long with wood surfaces covered with aluminum paint or reflectant material. In the chamber, there are 18 fixtures, each containing 4 lamps putting out 13.8 watts of ultraviolet light energy each (see table 1 and table 2 below). These lamps are located one (1) meter (39.3 inches) in parallel about a center point were 90-98 number 10 mail envelopes (4 1/8 in. x 9 ½ in) will be placed for disinfection.

Chamber Specifications:

Table 1

Chamber width	8	Ft	243.84	cm
Chamber height	8	Ft	243.84	cm
Chamber depth	16	Ft	487.68	cm
Fixture containing 4 lamps	59.2	Watts		
Lamp UV power	13.8	Watts		
# of lamps	72			
Lamp model	G36T6L			
Lamp arclength	36	In	91.44	cm
Lamp diameter	15.8	Mm	1.58	cm
Lamp radius			0.79	cm
Reflectivity	65	%	Aluminum Paint	
Lamp spacing	Axis-to-axis		2	cm
Center point	x-coord		121.92	cm
	y-coord		121.92	cm
	z-coord		243.84	cm
Front end of lamps	z-coord		198.12	cm
Back end of lamps	z-coord		289.56	cm

Table 2

Lamp fixtures coordinates (4 lapms each fixture)

Lamp fixture #	x1	y1	z1	x2	y2	z2
	cm	cm	cm	cm	cm	cm
1	116.92	213.36	198.12	116.92	213.36	289.56
2	118.92	213.36	198.12	118.92	213.36	289.56
3	120.92	213.36	198.12	120.92	213.36	289.56
4	122.92	213.36	198.12	122.92	213.36	289.56
5	124.92	213.36	198.12	124.92	213.36	289.56
6	126.92	213.36	198.12	126.92	213.36	289.56
7	213.36	123.92	198.12	213.36	123.92	289.56
8	213.36	121.92	198.12	213.36	121.92	289.56
9	213.36	119.92	198.12	213.36	119.92	289.56
10	126.92	30.48	198.12	126.92	30.48	289.56
11	124.92	30.48	198.12	124.92	30.48	289.56
12	122.92	30.48	198.12	122.92	30.48	289.56
13	120.92	30.48	198.12	120.92	30.48	289.56
14	118.92	30.48	198.12	118.92	30.48	289.56
15	116.92	30.48	198.12	116.92	30.48	289.56
16	30.48	119.92	198.12	30.48	119.92	289.56
17	30.48	121.92	198.12	30.48	121.92	289.56
18	30.48	123.92	198.12	30.48	123.92	289.56